

Thoughts of a Computer Artist

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Innovation and the Information Environment
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Preface and Background

In 1971, I was an architecture student and musician living in Copenhagen, Denmark. I found myself thinking about architecture as fluid experience rather than static objects, and felt constrained by traditional materials and was drawn to media studies. I had an idea for a kind of three-dimensional painting that would come off the canvas and surround me, and move in response to my movements the way a musician performs a musical instrument. It would be a kind of interactive liquid architecture, realized through real-time animation of computer models. I imagined that through the use of telecommunications technology, there could be many artists spread around the globe, interacting and performing in this common space, bringing their own visual and cultural traditions to it. As the technology developed, I grew closer and closer to realizing this dream. Along the way, I developed parallel interests in video, electronic/computer music, and computer graphics, as well as concerns for my own cultural heritage, feminism, environmental issues and scientific visualization, and have produced numerous works dealing with these processes and ideas.

From the beginning, it was clear to me that there would be an inevitable integration of communications and information technologies, if for no other reason than a sense that anything that provides accurate information faster, will be desired by large numbers of people. Today, I find that the complexities, concerns, and contradictions that arise from the intersection of digital technology with its multi-media and social components, leads, like a 4-dimensional spiral, back to fundamental questions of human nature. It seems that our general, cultural thinking about social structures, for example, has until recently been based on the maintenance of distinct and separate categories of human behavior and interaction, based on obsolete assumptions and technologies (ie. Marshall McLuhan's rear-view mirror concept). The extreme depersonalization of 19th century industrial technology is giving way to a more interdisciplinary, wholistic 21st century telecommunications-information technology. While still fraught with dangerous uses and the potential for isolation, there is great hope for its humanization due primarily to interactivity and interconnectivity of its many users. This technology can respect individual choice and provide a voice for the hopes and dreams of those previously excluded.

Just as people encompass both personal and public physical identities and communities, so their digital identities follow suit. But the social structures evolving on the Internet, for example, are not inhibited by physical limitations and structural separation, and take on completely new forms. The most interesting (and problematic) to me include collective identities, collective memory, constructed memory and constructed identity - such as individuals that never could exist physically, some with genetic code and behaviors that act as immortal, mutable agents. These agents can act on the psyches and bodies of real people in physical realities and on digital

creatures that inhabit only cyberspace. How does one get a grip on these possibilities, and understand non-physical behavior? What affect will it have on the economy and vice versa? I don't have answers to all these questions, but I do have observations and further questions based on the premise of this conference.

1. What is Innovation?

Innovation is the advancement of a discipline, finding new solutions to problems, new paradigms for thinking about things, and change in the way things are done. It implies the application of research to a body of knowledge, and incorporates imagination, leaps, free thinking based on stored information. It could even be that computers could assist in this process, being that they are dynamic instruments with nearly perfect memories. For example, process and time based art have already used computers to assist in the creative process: text based algorithms for generation of poetry, branching processes for the development of images, evolution based processes for sculpture (present choices - artist chooses on the basis of esthetics, computer presents more choices, etc). Moreover, synergy, the synthesis of other fields, the intersection of seemingly unrelated disciplines, the ability to see unusual relationships between seemingly unrelated fields and information, is to me the basis of innovation.

2. Just what is the Information Environment?

First of all, there are qualities unique to digital media. They include memory, computational prowess, high bandwidth data transfer, and high speed data transformation. It affects most fields of science, commerce, engineering, entertainment, and art. Being digital, they share a common structure and language, and are part of a continuum rather than completely separate entities. The most popular means for traversing this continuum is the Internet, particularly the data dissemination structure referred to as the World Wide Web.

Being a public space, the Internet is an environment where innovative activity can and does flourish, and the processes invoked are the mechanisms of change in this space. Computers are powerful, dynamic instruments more than just static recorders of data. Data changes quickly, and computers give us a window into what things are changing, the speed of change and how that change manifests itself. Since the information environment is both global and local, data does not necessarily need representation through proxy on the Internet. While humans have problems remembering details of large, complex systems, the computer does not. It does this for us. On the other hand, while it can translate data, it cannot interpret it. People are needed to give meaning to data and change it into information.

The issue of scale is an important one. Our ability to comprehend global events is very limited, but greatly improved through ethical use such things as remote scientific sensing devices (ozone measurement and deforestation, water and air pollution, earthquake, and other natural disaster monitoring). Electronic instruments, as Marshall McLuhan stated almost 3 decades ago, extend our central nervous systems, our perception of the world in and around us. But our devices are very limited, they exclude things beyond their grasp. Beware that you don't fall into the trap of thinking that data defines a phenomenon or community. It does not. It is only a sample. With this warning, my opinion is that the most important thing we can do with improved awareness is to

protect and nurture our extended environment, especially the fragile ones such as our natural and human communities. Further, I feel that the information environment in some way or other touches all of our environments, and should not be seen as something separate - everything is connected and is part of a continuum which potentially informs and affects our world - for better or worse. It is up to humans to decide whether their activities will be inclusive or exclusive, destructive or constructive. Our history is to use technology mostly destructively, or with good intentions but with destructive consequences. This is a danger which is very much a threat today. We have to actively and ethically work against destructive forces and promote constructive behavior. Censorship is not the answer in a democracy, but free and open discussion and education is. As a vehicle for education (formal and informal) and global, cultural discourse, all people regardless of class, race, nationality, gender, etc, should have equal access to information and opportunity provided on the Internet. Using the excuse of poverty to exclude people is a cruel and outmoded weapon. We should be as enlightened as we think we are and realize that helping others is helping ourselves. The earth and all its creatures is one, it is our own body, our community, our family, our home.

3. What are some of the changes that new technology brings to society and to artists?

The internet connects individuals globally, primarily through text (content) based computer systems, based on numerical information but also through static and moving graphics. As global, digital telecommunications seamlessly integrates into computer networks, the way in which we communicate on a daily basis with people all over the world will radically change. We will have real-time cellular video phones, where each person will be a reporter. Journalism will change. Some will become editors, researchers and consumers themselves, and some will return to trusting a specific editor, someone who has a track record we trust to do the editing for us. These editors, however, will have to win the respect of the user community rather than being ordained as experts, since corroborating evidence through computer searches will be easier than before, and feedback spreads like wildfire. We will have many public access Cable News Networks on the Internet, like discussion groups but with video and audio. But, just as images can be easily captured and transmitted, so too, can they be easily and undetectably altered. The most profound questions will have to do with truth...old questions to artists and photographers, but ever more relevant today.

4. What is the Market in the Information Environment? Should the Internet be free?

Expanded choices, in general, make for more responsive markets and ones which will be as volatile as any fashion, and as fickle or loyal as any group of human beings.

Data is shared amongst libraries, banks, private industry, private and public science laboratories, universities, artists and art studios, individuals, political parties, etc. What information is relevant to whom? And who should be able to get it and for what fee? I feel strongly that it is in the interest of everyone to provide equal access to everyone, and in so doing help those with less to achieve it. But as my colleague, artist Jane Veeder pointed out, "the '90's is an era of small minded, self interest." (from a telephone conversation 10-15-95) I feel that the Internet should remain free to those who cannot pay for it, and Jane feels that people who can afford it should pay for it, and those who can't shouldn't have to. She suggested having IRS data linked to fees

for Internet use, so that a sliding scale can be worked out for US users. This way, people with low incomes would not pay anything and as people's income increases, so do their fees. This is a good idea, but I would prefer a global solution, especially since there are no international boundaries (yet) on the network. Perhaps this would mean infrastructure support from the World Bank, or the United Nations. On a national level, I feel that access to the network should be like access to public roads, schools, libraries, courts, etc. and should be considered vital to survival. A possible scenario: global infrastructure (satellite technology) paid for by the World Bank or UN, with downlinks and backbones of regional networks paid for by individual countries through taxes, and local hookups paid for through local taxes (organized by libraries) and private sources. It's sort of like shortwave radio, where anybody can broadcast and send (from a public or private/commercial entity), and everybody can receive for free. The waves themselves are public and should not be privatized. One can still do commercial work, it's just that important public work - such as informing people of impending natural disaster, social issues like elections, riots, wars, etc. - can continue independent of commercial pressures. If it means paying some taxes, so what? We're the richest country in the world, we can afford it. Moreover, there is in fact a public, and there are still public spaces and public interests, and they, including a public Internet, should be vigorously protected so that democracy can flourish. The sign of a strong democracy, to me, is one which allows and supports free and open discussion, and embraces the right to express divergent views on principle. One reason why the Internet is so popular is because it is free and open. That's why it is so interesting. It is imagination that people want to see most, and you can't always correlate money with that. Often, the most imaginative people are the ones with the least resources. So, restricting use of the net to those who can pay for it will make it much less interesting, much less democratic, and much less popular.

Just as we have private businesses on our public roads, we already have private concerns on the network. The World Wide Web is the hottest advertising medium of the '90's. But there are differences between commodities in cyberspace and those in physical space. Goods and services take on new forms. We have access to libraries of information, images from satellites and image banks, interactive television, interactive games on the network, edutainment, long distance, interactive studios for the creation of artwork for publication, design services for the creation of web pages, etc. How do we charge for what we provide? By hits? Or should we give things away for free? Do the images available on the network belong to the public? Is our private web page public? Is it mostly advertising for something else, the real thing, a physical product sent to your home after you enter your VISA number? How do we protect data on computers we don't want people to have access to? My answer to the last question is simple: take the data off of the server if you don't want it on the net. Finally, what rights and protections do we have for our work that is on the net?

5. What is Intellectual Property in the arts in cyberspace and how do we protect it?

Some artists feel that the Internet is a public space and that art on the network should be considered public art. This also means, to some, that all material is in the public domain and is free to be used by others. They feel that artists should not put work out there that they would feel badly about if copied and distributed. I feel that putting artwork on the network is putting it in the electronic town square for everyone to view for free. But that does not mean that advertising

agencies, for example, should be able to take that work and exploit it without permission and proper credit. I, myself, have put a great deal of my work on the net to make it easier for people doing research on me and my work to get the information. I am more interested in better representation of me and my work than protecting a currently impossible to protect copyright. However, I have included the copyright notice as a formality - because there is no alternative that deals with my rights on the network. Something like: it is permissible to copy for personal (non-commercial) use as long as the proper credits are included. It is desktop mass publication and distribution, but it reaches primarily Internet users. In this environment, I would have a dilemma about asking people to pay for it, especially if they are just looking. Theoretically, the value of artwork goes down if everyone has it for free. But giving away computer software makes a bigger market for that software. And with art, fortune follows fame, working more or less the same way.

Generally, the market for computer art has been problematic, since no one knows what the original is. Is it a list of 0's and 1's? Is it the program that created an image or the first experience of the artwork? And what about the ideas, sensations, and thoughts that created the art or constitutes the experience of the art work? Are they the same? Is there a breakdown of distinctions between the artist, the artwork and audience? Between process and product? Is the idea the most important thing? If so, can you copyright an idea? Digital art obsolesces the notion of the original. It fundamentally dematerializes art and is not really about objects anymore (although there will always be people who want to make objects using computers). It is something else, especially if it never leaves the realm of the computer. There is a continuum between all measurable phenomena and all media using digital processes. In the realm of the computer, everything can be translated into something else, and those forms can be "things" we have never seen before. If it mutates over time like a movie or a piece of music, is it a performance? And if you or someone you don't know can freeze an algorithmic process at any point and make a printout or milled object, who is the author or artist? Art is about change and transformation, and is partly process. On the Internet, the users or audience are part of that process and part of that artwork. The original is the experience, and everyone has their own, original artwork in their mind.

6. Information is Money is Power vs Information is Education is Empowerment

If money is power, then information is money is power. Hits on a Web page could translate into money. Should the more popular sites get more money, or should they get less per hit since the volume is so high? When commerce is based on exchange of information, such as statistics and market data, then the information itself is the commodity. When this information takes the form of text, an image, or sound, these are also commodities. This seems appealing, especially when I see my ideas and artwork propagated through other people, who often gain financially as a result. I would like a tag on that information so that even if I don't get income as a result, at least I would get credit. On the other hand, I worry about the tendency to hoard anything worth money, in this case information. We should be less selfish and more generous, and empathize with those who have less. It is noble and good, improves lives and makes for a healthier, friendlier community. As an artist/professor, I feel that the benefits to the individual are greater when the entire population (a collection of individuals, after all) is raised up, as through public education. Information educates and empowers, and in an egalitarian democracy, all

should have equal access to information and opportunity regardless of income. The idea that information should be hoarded strikes me as regressive, and reminds me of when only rich people could get an education, when all schools were private and minorities were excluded. Just as the informed worker is more valuable and can do more, so, too, a smarter public earns and consumes more. From a purely economic standpoint, it seems that education is good for business. It is also ethical. And ethics, the most important human quality, should guide us as we navigate this digi-incognita, this expanding universe created in reflection of human thought.

Vibeke Sorensen
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